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proved in the Punjab of inducing the people to submit to it extensively in anticipation of an outbreak of plague point to inoculation as a measure on which we are justified in placing considerable hope and reliance.

"Inoculation is the only measure that Government can hope to induce the people to adopt effectively on a scale at all adequate to the requirements of the situation.

"Inoculation can be brought within the reach of those whom we have to protect from plague at an expenditure of a little more than an anna and a quarter (i. e., 2½ cents) per head of population of the infected districts.

"The measure of inoculation now proposed holds out a promise that for the not immoderate expenditure of 864,000 rupees (\$280,281.60), the calamity under which the Punjab suffers may be immediately alleviated, while the extension of the disease may be stayed and the serious consequences which must follow on its extension may be obviated. This is a promise that no other measure, which is at present practicable, holds out to us.

"Government is aware that the above were the considerations which guided me when introducing in 1897 the plague prophylactic inoculation as the measure for combating the plague epidemic. As there was at the time universal opposition to these views, I had to take upon myself to make the following prediction: 'On analyzing the nature of the things, there remains no possibility of doubt that the programme contained in the above lines' (i. e. my suggestion of modifying the segregation-disinfection plan in favor of those who underwent antiplague inoculation) 'will be adopted universally, though after a more or less prolonged expenditure of effort in many other directions, and after being lamentably retarded by the prevalent divergence of views.' (Memorandum of June 21, 1898.)

"Notwithstanding the many difficulties which the general adoption of this inoculation as the specific method of combating the epidemic has met with so far, I have no doubt that such an adoption will ultimately take place." (Quoted from Report of Plague Research Laboratory, April 21, 1904.)

There can be no question in the minds of those who study the reports of inoculation, that the great reduction in mortality effected by the prophylactic makes it promise to be the only effective method of combating plague.

I inclose a statement just published by Capt. S. B. Smith, of the Indian medical service, concerning the results of inoculation in the District of Amritsar, in the Punjab, North India, about 1,000 miles by rail from Bombay. Captain Smith is the district plague medical officer.

Inoculations in the Amritsar district, Punjab.

Report of Capt. S. B. Smith, of the Indian medical service.

The population of the district is 1,023,828. Plague cases, October 1, 1902, to June 20, 1903, 41,462; plague deaths, October 1, 1902, to June 20, 1903, 27,879, giving an annual rate per thousand as follows: Cases, 40.5 per thousand; deaths, 27.2 per thousand.

Whether as the result of previous year's operations and methods of compulsory evacuation, disinfection, etc., or not, the general idea pervading the whole district was that the occurrence of a case of plague in the house was but the precursor of other evils to the inmates and to the village itself in the shape of Government interference, which would be averted only if the case could be successfully concealed. As long as the patient lived this could often be done, and it was only on death supervening that the case came to light and was reported. The proportion of deaths to cases is certainly, therefore, too high. In many instances villages have returned the same number of deaths as cases, making the case mortality 100 per cent.

The total number inoculated was 62,773, rather more than 6 per cent of the total population. Of these, 43,619 were males and 19,154 were females. In this number there occurred 770 cases of plague with 238

deaths. The comparatively large number of cases is due to the fact that inoculation was done chiefly in villages where plague was active. Many cases occurred within a few days of inoculation and must have been incubating plague at the time of the operation. A certain number were found to have been suffering with plague at the time of the operation; these 33 cases and 27 deaths should be regarded as plague in the uninoculated and are therefore deducted, leaving 737 cases with 211 deaths among the inoculated. The cases of mortality were as follows, for the total number:

	Cases of mortality (per cent of cases).	Ratio of attacks to deaths.
Uninoculated.....	67.85	1.5 to 1
Inoculated.....	28.63	3.5 to 1

Correct conclusions could not, however, be drawn from the total numbers; hence the following procedure was adopted: All villages in which a considerable percentage of inoculated persons were exposed to plague side by side with uninoculated were studied separately to the number of 102. Several errors occurred in making the calculations, but were in favor of the uninoculated. Cases occurring within three days of inoculation have been excluded from the percentages of inoculated on the ground that they were incubating plague at the time of the operation. Nor were these cases used to swell the totals of the the uninoculated. The calculations in the following table, therefore, greatly favor the uninoculated.

*Statement of plague in inoculated and uninoculated Amritsar district,
October 1, 1902, to June 20, 1903.*

Number of villages examined	102
Total population of above	161,763
Total inoculations in above	42,390
Average duration of epidemic.....days..	63
Average number exposed to infection daily:	
Uninoculated	130,929
Inoculated	30,834
Plague in uninoculated:	
Cases	11,233
Deaths	7,888
Plague in inoculated:	
Within three days—	
Cases	86
Deaths	60
After third day—	
Cases	572
Deaths	150
Percentages:	
Cases—	
Uninoculated	8.58
Inoculated	1.21
Deaths—	
Uninoculated	6.02
Inoculated49
Ratio in equal number of uninoculated and inoculated:	
Cases	7 to 1
Deaths	12 to 1